### 3.3.8.6 Emergent Aquatic

#### 3.3.8.6.1 Community Overview

These open, marsh, lake, riverine and estuarine communities with permanent standing water are dominated by robust emergent macrophytes, in pure stands of single species or in various mixtures. Dominants include cattails, bulrushes (particularly *Scirpus acutus*, *S. fluviatilis*, and *S. validus*), bur-reeds, giant reed, pickerel-weed, water-plantains, arrowheads, the larger species of spikerush (such as *Eleocharis smallii*), and wild rice.

Aquatic plants, including both emergent and submergent aquatic vegetation, form the foundation of healthy and flourishing aquatic ecosystems - both within lakes and rivers and on the shores and wetlands around them. They not only protect water quality, but they also produce life-giving oxygen. Aquatic plants are a lake's own filtering system, helping to clarify the water by absorbing nutrients like phosphorus and nitrogen that could stimulate algal blooms. Plant beds stabilize soft lake and river bottoms and reduce shoreline erosion by reducing the effect of waves and current.

Aquatic plants also serve as spawning habitat for fish and amphibians, as shelter for various life stages of a variety of species, and as nesting habitat for birds. Plant beds support populations of aquatic insects that serve as a food base for other species. Seeds and other plant parts provide vital nutrition to a number of waterfowl and other bird species. Healthy, native aquatic plant communities also help prevent the establishment of invasive exotic plants like Eurasian watermilfoil.

#### 3.3.8.6.2 Vertebrate Species of Greatest Conservation Need Associated with Emergent Aquatic

Thirty-nine vertebrate Species of Greatest Conservation Need were identified as moderately or significantly associated with emergent aquatic (Table 3-183).

**Table 3-183. Vertebrate Species of Greatest Conservation Need that are (or historically were) moderately or significantly associated with emergent aquatic communities.**

| ***Species Significantly Associated with Emergent Aquatic*** |
|---|
| **Birds** |
| Red-necked Grebe |
| American Bittern |
| Great Egret |
| Snowy Egret |
| Trumpeter Swan |
| American Black Duck |
| Blue-winged Teal |
| Redhead |
| King Rail |
| Whooping Crane |
| Solitary Sandpiper |
| Hudsonian Godwit |
| Marbled Godwit |
| Short-billed Dowitcher |
| Wilson's Phalarope |
| Forster's Tern |
| Black Tern |
| **Herptiles** |
| Four-toed Salamander |
| Blanchard's Cricket Frog |
| Boreal Chorus Frog |
| Pickerel Frog |
| Mink Frog |
| Blanding's Turtle |
| Queen Snake |
| Butler's Garter Snake |
| Eastern Massasauga Rattlesnake |
| **Mammals** |
| Moose |
| ***Species Moderately Associated with Emergent Aquatic*** |
| **Birds** |
| Yellow-crowned Night Heron |
| American Golden Plover |
| Whimbrel |
| Dunlin |
| Buff-breasted Sandpiper |
| Common Tern |
| Rusty Blackbird |
| **Herptiles** |
| Western Ribbon Snake |
| **Mammals** |
| Northern Long-eared Bat |
| Silver-haired Bat |
| Eastern Red Bat |
| Hoary Bat |

In order to provide a framework for decision-makers to set priorities for conservation actions, the species identified in Table 3-183 were subject to further analysis. The additional analysis identified the best

opportunities, by Ecological Landscape, for protection, restoration, and/or management of both emergent aquatic and associated vertebrate Species of Greatest Conservation Need. The steps of this analysis were:

- Each species was examined relative to its probability of occurrence in each of the 16 Ecological Landscapes in Wisconsin. This information was then cross-referenced with the opportunity for protection, restoration, and/or management of emergent aquatic in each of the Ecological Landscapes (Tables 3-184 and 3-185).

- Using the analysis described above, a species was further selected if it had both a significant association with emergent aquatic and a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of emergent aquatic. These species are shown in Figure 3-44.

**Table 3-184. Vertebrate Species of Greatest Conservation Need that are (or historically were) *significantly* associated with emergent aquatic communities and their association with Ecological Landscapes that support emergent aquatic.**

| Emergent Aquatic | Birds (17)* | | | | | | | | | | | | | | | | | Herptiles (9) | | | | | | | | | Mammals (1) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type | Red-necked Grebe | American Bittern | Great Egret | Snowy Egret | Trumpeter Swan | American Black Duck | Blue-winged Teal | Redhead | King Rail | Whooping Crane | Solitary Sandpiper | Hudsonian Godwit | Marbled Godwit | Short-billed Dowitcher | Wilson's Phalarope | Forster's Tern | Black Tern | Four-toed Salamander | Blanchard's Cricket Frog | Boreal Chorus Frog | Pickerel Frog | Mink Frog | Blanding's Turtle | Queen Snake | Butler's Garter Snake | Eastern Massasauga Rattlesnake | Moose |
| **MAJOR** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Central Sand Hills | | ■ | | | | | ■ | | | ■ | ▭ | ▭ | | ■ | | ■ | ■ | ▭ | | | ▭ | | ■ | | | | |
| North Central Forest | | ■ | | | ■ | | | | | | ▭ | | | | | | ▭ | ■ | | ■ | ▭ | ■ | | | | | ▭ |
| Northern Highland | | ▭ | | | | | ▭ | | | | ▭ | | | ■ | | | ■ | ■ | | | | ■ | | | | | ▭ |
| Northern Lake Michigan Coastal | | ▭ | ■ | ▭ | | | ■ | | | | ▭ | ■ | ▭ | ■ | | ■ | ■ | ▭ | | | ▭ | ■ | ▭ | | | | |
| Northwest Sands | ▭ | ■ | | | ■ | | ■ | | | | ▭ | ▭ | ▭ | ■ | ▭ | | ■ | ▭ | | ■ | ▭ | ▭ | ■ | | | | |
| Southeast Glacial Plains | ■ | ■ | | ▭ | | | ■ | ■ | ■ | ■ | ▭ | ■ | ▭ | ■ | ▭ | ■ | ■ | ■ | | | ■ | | ■ | ■ | ■ | ■ | |
| Superior Coastal Plain | | ■ | | | ■ | | ■ | | | | ▭ | ▭ | ■ | ■ | | | ■ | ■ | | ■ | ▭ | ■ | | | | | ▭ |
| Western Coulee and Ridges | | | ■ | | | | ■ | | ▭ | ▭ | ▭ | | | ■ | | | ▭ | ■ | ■ | | ■ | | ■ | | | ■ | |
| Western Prairie | ▭ | ▭ | ▭ | | ■ | | ■ | | ▭ | | ▭ | ▭ | ■ | ■ | | | ▭ | | | | ▭ | | ■ | | | | |
| **IMPORTANT** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Central Lake Michigan Coastal | | ▭ | ■ | ▭ | | | ■ | | ▭ | | ▭ | ■ | ▭ | ■ | ▭ | ■ | ■ | ■ | | | ▭ | | ▭ | | ▭ | | |
| Central Sand Plains | ▭ | ■ | | | ■ | | ■ | | ▭ | ■ | ▭ | ▭ | | ■ | ▭ | | ■ | ■ | | | ▭ | | ■ | | | ▭ | |
| Forest Transition | | ■ | | | ■ | | ■ | | | | ▭ | ▭ | | ■ | | | ■ | ■ | | | ▭ | | | | | | |
| Northeast Sands | | ▭ | | | | | | | | | ▭ | | | | | | | ▭ | | | ▭ | ■ | ▭ | | | | |
| Northwest Lowlands | | ■ | | | | | ▭ | | | | ▭ | | | | | | ▭ | ■ | | ■ | ▭ | ■ | | | | | ▭ |
| Southern Lake Michigan Coastal | | ▭ | | | | | ▭ | | ▭ | | ▭ | ▭ | ▭ | ■ | | ■ | ■ | | | | | | | ▭ | ▭ | ■ | |
| PRESENT (MINOR) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Southwest Savanna | | | | | | | ▭ | | | | ▭ | | | | | | | | ■ | | ■ | | ■ | | | | |

Color Key
■ = HIGH probability the species occurs in this Ecological Landscape
▭ = MODERATE probability the species occurs in this Ecological Landscape
▭ = LOW or NO probability the species occurs in this Ecological Landscape

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

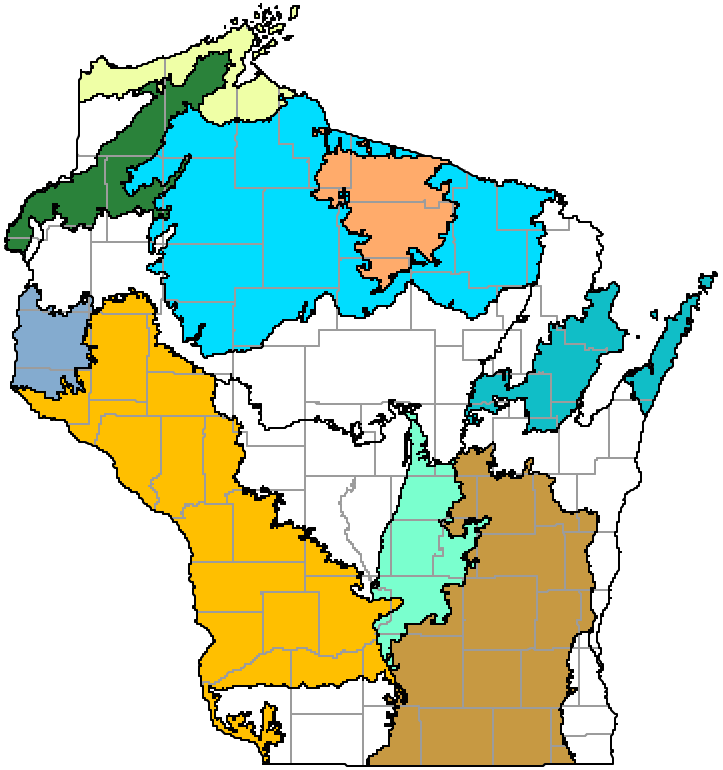
**Table 3-185. Vertebrate Species of Greatest Conservation Need that are (or historically were) *moderately* associated with emergent aquatic communities and their association with Ecological Landscapes that support emergent aquatic.**

| Emergent Aquatic | Birds (7)* | | | | | | | Herptiles (1) | Mammals (4) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ecological Landscape grouped by opportunity for management, protection, and/or restoration of this community type | Yellow-crowned Night-Heron | American Golden Plover | Whimbrel | Dunlin | Buff-breasted Sandpiper | Common Tern | Rusty Blackbird | Western Ribbon Snake | Northern Long-eared Bat | Silver-haired Bat | Eastern Red Bat | Hoary Bat |
| **MAJOR** | | | | | | | | | | | | |
| Central Sand Hills | | M | | M | | | M | | M | M | M | M |
| North Central Forest | | | | | | | M | | M | H | M | H |
| Northern Highland | | H | | M | M | | M | | | | M | |
| Northern Lake Michigan Coastal | | H | H | H | M | H | M | | M | M | M | M |
| Northwest Sands | | M | | M | | | M | | | | | |
| Southeast Glacial Plains | M | H | M | H | H | H | H | | M | M | M | M |
| Superior Coastal Plain | | H | H | H | H | H | M | | M | M | M | M |
| Western Coulee and Ridges | H | M | | | M | | H | | H | M | M | M |
| Western Prairie | | M | | M | M | | M | | | | | |
| **IMPORTANT** | | | | | | | | | | | | |
| Central Lake Michigan Coastal | M | M | H | H | M | H | M | | M | M | M | M |
| Central Sand Plains | | M | | M | | | M | | M | M | M | M |
| Forest Transition | | H | | M | M | | M | | M | M | H | M |
| Northeast Sands | | | | | | | M | | | | | |
| Northwest Lowlands | | | | | | | M | | M | M | M | M |
| Southern Lake Michigan Coastal | M | | H | H | H | | M | | | | | |
| PRESENT (MINOR) | | | | | | | | | | | | |
| Southwest Savanna | | M | | | M | | M | | M | | M | |

Color Key
H = HIGH probability the species occurs in this Ecological Landscape
M = MODERATE probability the species occurs in this Ecological Landscape
= LOW or NO probability the species occurs in this Ecological Landscape

*** The number shown in parentheses is the number of Species of Greatest Conservation Need from a particular taxa group that are included in the table. Taxa groups that are not shown did not have any Species of Greatest Conservation Need that met the criteria necessary for inclusion in this table.**

**Figure 3-44. Vertebrate Species of Greatest Conservation Need that have *both* a significant association with emergent aquatic *and* a high probability of occurring in an Ecological Landscape(s) that represents a major opportunity for protection, restoration and/or management of emergent aquatic.**



**Central Sand Hills**
American Bittern
Blue-winged Teal
Whooping Crane
Short-billed Dowitcher
Forster's Tern
Black Tern
Blanding's Turtle

**North Central Forest**
American Bittern
Trumpeter Swan
Four-toed Salamander
Boreal Chorus Frog
Mink Frog

**Northern Highland**
Short-billed Dowitcher
Black Tern
Four-toed Salamander
Mink Frog

**Northern Lake Michigan Coastal**
Great Egret
Blue-winged Teal
Hudsonian Godwit
Short-billed Dowitcher
Forster's Tern
Black Tern
Mink Frog

**Northwest Sands**
American Bittern
Trumpeter Swan
Blue-winged Teal
Short-billed Dowitcher
Black Tern
Boreal Chorus Frog
Blanding's Turtle

**Southeast Glacial Plains**
Red-necked Grebe
American Bittern
Blue-winged Teal
Redhead
King Rail
Whooping Crane
Hudsonian Godwit
Short-billed Dowitcher
Forster's Tern
Black Tern
Four-toed Salamander
Pickerel Frog
Blanding's Turtle
Queen Snake
Butler's Garter Snake
Eastern Massasauga Rattlesnake

**Superior Coastal Plain**
American Bittern
Trumpeter Swan
Blue-winged Teal
Marbled Godwit
Short-billed Dowitcher
Black Tern
Four-toed Salamander
Boreal Chorus Frog
Mink Frog

**Western Coulees and Ridges**
Great Egret
Blue-winged Teal
Short-billed Dowitcher
Four-toed Salamander
Blanchard's Cricket Frog
Pickerel Frog
Blanding's Turtle
Eastern Massasauga Rattlesnake

**Western Prairie**
Trumpeter Swan
Blue-winged Teal
Marbled Godwit
Short-billed Dowitcher
Blanding's Turtle

### 3.3.8.6.3 Threats and Priority Conservation Actions for Emergent Aquatic

#### 3.3.8.6.3.1 Statewide Overview of Threats and Priority Conservation Actions for Emergent Aquatic

The following list of threats and priority conservation actions were identified for emergent aquatic in Wisconsin. The threats and priority conservation actions described below apply to all of the Ecological Landscapes in Section 3.3.8.6.3.2 unless otherwise indicated.

Threats and Issues

- Disturbance from recreational powerboats can cause sedimentation and physical damage to aquatic plants.
- Weed removal and use of pesticides damage habitat and encourage invasives.
- Lakeshore/rivershore development can alter shoreline habitat and increase erosion.
- Sedimentation, eutrophication, and pollution of water can cause detrimental changes to community composition, structure, and function. Mercury, polychlorinated biphenyls and other pollutants are a serious issue in some northern Ecological Landscapes (e.g., Northern Highland, Northern Lake Michigan Coastal, Northwest Sands, and Northwest Lowlands).
- Invasive plants can replace native plants and affect aquatic communities.
- Dams and impoundments can raise water levels to the detriment of this community type.

Priority Conservation Actions

- This community type should be managed as a complex with other forest and wetland types.
- Protect more of this community type by working with conservation managers and interest groups.
- Consider adopting no-wake zones to protect vegetation.
- Buffer uplands and manage shorelines to prevent erosion and sedimentation, and to limit pollutant inputs.
- Restore shorelines where feasible.
- Restore hydrology where possible. Maintain cycles of fluctuating water levels, based on additional studies that characterize appropriate cycles and timing.
- Additional surveys are needed to locate high quality community occurrences and rare species' populations on shorelines and in associated marsh habitats. Plot sample data are needed for documentation of species composition and diversity.
- Attach Sensitive Area Designation to sites that meet the criteria of that designation, as one means to protect emergent plant communities from degradation caused by human activity.
- Continue and support research to find biocontrols for invasives; control spread of new invasives. Control existing invasives on a site-by-site basis.

#### 3.3.8.6.3.2 Additional Considerations for Emergent Aquatic by Ecological Landscape

Special considerations have also been identified for those Ecological Landscapes where major or important opportunities for protection, restoration, and/or management of emergent aquatic exist. Those considerations are described below and are in addition to the statewide threats and priority conservation actions for emergent aquatic found in Section 3.3.8.6.3.1.

Additional Considerations for Emergent Aquatic in Ecological Landscapes with ***Major*** Opportunities for Protection, Restoration, and/or Management

*Central Sand Hills*

Invasive plants (e.g., reed canary grass, giant reed and purple loosestrife) can replace native plants and affect aquatic communities. Effects of past management (e.g., filling marshes) are very evident in this Ecological Landscape. Grassy Lake Wildlife Area (Columbia County) and Lawrence Creek State Natural Area (Marquette County) are examples of high quality emergent aquatic communities here.

*North Central Forest*

Invasive plants (e.g., purple loosestrife) can replace native plants. Dams have raised water levels and affected this community type in some sites but created marsh habitat in locations further upstream. Totagatic Lake (Bayfield County) is a quality site.

*Northern Highland*

This Ecological Landscape contains some unique and sensitive marsh types. Large areas in public ownership help to ensure the viability of this community here. Frog Lake and Pine State Natural Area (Iron County) showcase high quality examples of this type.

*Northern Lake Michigan Coastal*

Significant alterations to wetlands have impacted this community here, but some restoration attempts have restored this community in wildlife areas along the west shore of Green Bay, to the benefit of fish such as northern pike. Mink River Estuary and the Dunes Lake area (both in Door County) contain intact examples of emergent marsh.

*Northwest Sands*

Cranberry operations, though currently limited here, have the potential to decrease the amount of wetland habitat, alter natural communities, and affect local hydrology and water quality. An appreciable number of lakes still support viable emergent aquatic communities here. Some of the larger marshes in this Ecological Landscape occur along impounded portions of rivers or small streams. Good examples of the emergent marsh community include the Gordon Flowage on the St. Croix River (Burnett County) and some of the managed flowages at Crex Meadows (Wood County).

*Southeast Glacial Plains*

Invasive plants (e.g., Phragmites, reed canary grass, purple loosestrife, flowering rush, glossy buckthorn, narrow-leaved cattail) can replace native plants and affect aquatic communities. Many marshes are becoming highly dominated by cattails. Botulism is a concern when oxygen content is low. Remaining lead shot in hard-bottomed water bodies still occasionally results in poisoning. Carp are a threat, and so are effects of carp control efforts. There are continuing effects of past management (e.g., draining and filling marshes).

This Ecological Landscape formerly included many marshes. It is among the best Ecological Landscapes regarding the potential for restoring and managing this type. Existing sites include Horicon Marsh (Dodge County) (and the satellite Fox River Crane Marsh), Rush Lake and Fox River marshes (Winnebago County), many Wildlife Areas, and a number of Waterfowl Production Areas. Restoration areas include

the Glacial HRA (Fond du Lac County) (using the wetland reserve program). Formerly drained wetlands (e.g., muck farms) have been recently purchased and may be converted and managed as marsh. More of this community type should be protected by working with conservation managers and interest groups. Watersheds should be managed to control runoff from surrounding agricultural areas that may contribute nutrients and sediment. Drawdowns for shorebird management are effective, but the needs of amphibians and reptiles should be considered; consider timing drawdowns to reduce the threat of botulism. These sites should be monitored to determine whether management is maintaining native diversity and the effects of non-native cattails should be researched.

*Superior Coastal Plain*

Disturbance from recreational powerboats coming into rivers from Lake Superior can cause sedimentation and physical damage to aquatic plants. Eutrophication (in St. Louis River estuary, Port Wing) can cause detrimental changes to community structure. Invasive plants (e.g., purple loosestrife, Phragmites, reed canary grass) have replaced native plants. Soil erosion and sedimentation from uplands into water bodies is a particular threat in this Ecological Landscape due to the erodible soils. Agriculture, impermeable surfaces, and lack of conifers contribute to peakflow episodes during spring snowmelt. Unsustainable forest management practices can result in soil erosion and water quality issues.

This type is primarily associated with coastal embayments on Lake Superior. Inland lakes are scarce in this Ecological Landscape. Uplands within the watershed should be reforested, restoring conifers where possible. Best Management Practices and other sustainable forest management practices should be used to limit detrimental soil and water effects. Adaptive management techniques should be used to restore structure and composition. More information on land use in the watershed should be gathered and effects on peakflows into emergent aquatic community sites should be researched.

*Western Coulees and Ridges*

Development on ridges above rivers can alter shoreline habitat and increase erosion. Rip-rapping, levees, seawalls, and dikes have been constructed (these have some positive effects in protecting marshes behind dikes). Invasive plants (e.g., reed canary grass, purple loosestrife) can replace native plants. Invasive animals (e.g., common carp) are also a problem for this community type. An astounding abundance of dams in this Ecological Landscape raised water levels to eliminate this community type in some sites, but created marsh habitat in other locations. Dams also change timing and duration of water level fluctuations. Barge traffic on the Mississippi requires dredging and disposal of materials, which stirs up bottom sediments, and results in wave impacts. Past drainage for agricultural uses, and filling for roads, railroads, and industrial sites, reduced marsh habitat. Competing economic interests limit opportunities for this type in the Ecological Landscape, especially in the Mississippi River valley.

The Mississippi River corridor is of continental importance to migratory waterfowl. This community is found primarily in the backwaters of large rivers (e.g., Mississippi (Grant, Crawford, Pepin, Pierce, Trempealeau Counties), Chippewa (Pepin and Buffalo Counties), Wisconsin (Crawford and Grant Counties), and Black Rivers (LaCrosse County)). Emergent marsh should be managed as a complex with floodplain forest, submergent marsh, wet meadow, shrub-carr, and adjoining uplands. Advocating for river flow management and other actions that are more beneficial to emergent plant communities, fish and wildlife should be continued. The Chippewa River Bottoms (Buffalo County) and the Trempealeau Delta (Trempealeau County) are examples of healthy emergent aquatic communities.

*Western Prairie*

Development on hilltops above rivers can alter shoreline habitat and increase erosion. Increasing human population levels due to the expansion of the nearby Twin Cities metropolitan area has resulted in rapidly increasing development. Agricultural practices are often used too close to pothole habitat. Invasive plants (e.g., reed canary grass, purple loosestrife) can replace native plants. Invasive animals (e.g., carp) are also a problem for this community type. Raising baitfish in potholes is a threat. There are few dams in this Ecological Landscape, but some large ones exist on the Willow and Apple Rivers, and may have raised water levels to eliminate this community type in some sites and create marsh habitat in other locations. Dams also change the timing and duration of fluctuations in water levels. Past drainage for agricultural use reduced marsh habitat. Past filling for roads and railroads has impacted the community type by altering hydrology.

This community is found in this Ecological Landscape primarily in pothole lakes and also on backwaters of the St Croix River (Pierce County). Historically, this Ecological Landscape was the only part of the state where prairie potholes were found. Emergent pothole vegetation has dwindled in remaining potholes; the few remaining sites should be preserved and managed as a complex with other grassland or prairie communities, and floodplain forests along the St. Croix River. Incentives should be provided to buffer potholes with prairie or grassland to protect the emergent aquatic community. Detrimental recreational activities on the St. Croix River should be excluded by such means as creating no-wake zones near sensitive marsh habitat. Uplands should be buffered and shorelines should be managed to prevent erosion and sedimentation, and limit pollutant inputs. Shorelines should be restored where possible. Introduction of baitfish into potholes, which disrupts amphibian, invertebrate, and other components of these communities, should be controlled. The St. Croix Islands Wildlife Area (St. Croix County) remains a high quality example of this community.

Additional Considerations for Emergent Aquatic in Ecological Landscapes with ***Important*** Opportunities for Protection, Restoration, and/or Management

*Central Lake Michigan Coastal*

Invasive plants (e.g., Phragmites, reed canary grass, purple loosestrife) can replace native plants and affect aquatic communities. Continuing effects of past management (e.g., filling marshes) are evident. Grass Lake (Calument County) supports a good emergent aquatic community. Kewaunee River Marsh (Kewaunee County) and Little Tail Point (Brown County) are examples of other emergent communities in public ownership.

*Central Sand Plains*

Many streams have been hydrologically altered and marshes drained here for various agricultural purposes. Research may be necessary to determine whether emergent communities can be restored under this scenario of flow alteration. Windy Run and Marsh (Clark County) and Monroe County Flowage in the Meadow Valley Wildlife Area are examples of this community here.

*Forest Transition*

Invasive plants (e.g., purple loosestrife) can replace native plants. Dams have raised water levels to eliminate this community type in some sites but also create marsh habitat in other locations. Drainage for

agricultural use reduced marsh habitat. Pope Lake (Waushara County) and Tenmile Creek Marsh (Rusk County) typify this community here.

*Northeast Sands*

Development on popular lakes may pose a threat to this community. Utricularia Bay on Warrington Lake (Oconto County) is an excellent example of this community type here, and several others are protected on the Menominee reservation. The ability of lake classification to protect remaining populations of emergent vegetation on lakes subject to housing development and recreational use should be investigated.

*Northwest Lowlands*

Most problems due to lakeshore development and recreational use are associated with the larger developed lakes. Invasive plants (e.g., purple loosestrife) have replaced native plants in some areas. Pockets of marsh exist along lake and stream shores, as well as state-managed wildlife flowages (Douglas County).

*Southern Lake Michigan Coastal*

Increasing population levels due to proximity to the expanding Milwaukee metropolitan area continue to drive rapidly increasing development and land use conversion. Land use planning that is not comprehensive and does not emphasize conservation considerations can lead to development in locations that limit options for restoring and managing this community. Continuing effects of past management (e.g., filling marshes) are evident on the landscape, and pose barriers to restoring this community here. Past drainage for agricultural use reduced marsh habitat. Agricultural activities in close proximity to water bodies have led to sedimentation, eutrophication, and increased runoff, causing detrimental changes to community structure. Runoff is likely increasing due to development and increases in impervious surface area. Invasive plants (e.g., Phragmites, reed canary grass, purple loosestrife) can replace native plants and affect aquatic communities. Invasive animals (e.g., carp, rusty crayfish) are also a problem for this community type.

Use of existing land use plans that call for conservation actions should be encouraged. Watersheds should be managed to control runoff that may contribute nutrients and sediment. Brighton Marsh and Woodland (Kenosha County) and Mission Hills Wetlands (Milwaukee County) are good examples of this community in southeast Wisconsin.